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Apparently healthy cows can harbor subclinical mastitis, which creates tremendous loss in milk production. This NebGuide offers a method for detecting this disease.

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The dairyman is generally aware of clinical mastitis because it can be seen as changes in the milk, swollen udder and other signs exhibited by the cow. Compared with subclinical mastitis, clinical mastitis is much less costly, is of short duration, tends to be an individual cow problem, and is detected without special tests.

Unfortunately, the apparently healthy cow can harbor subclinical mastitis, which creates tremendous loss in milk production. A cow with subclinical mastitis does not have a swollen, painful udder or abnormal looking milk. Infection is present, however, creating an elevation of the somatic cell (white blood cells and epithelial cells) count in the milk. These unseen infections are detected by several methods, including the direct microscopic somatic cell count (DMSCC), the Wisconsin Mastitis Test (WMT), and the California Mastitis Test (CMT). The DMSCC and WMT are laboratory tests but, fortunately for dairymen, the CMT is a cowside test that can be a valuable tool, yielding rapid results.

Important Information from CMT Results

The use of the CMT on the entire herd at monthly intervals can be extremely useful as an aid in detecting herd mastitis problems. Individual and total quarter infections can be determined and, with proper records, the level of herd mastitis can be monitored. This test yields information that can aid in determining faulty milking procedures or equipment function, as well as the effectiveness of teat dips and dry cow treatment programs.

How the CMT Works and What It Means

Mixed with milk, the CMT chemical or reagent reacts with leucocytes (white blood cells) that are usually present in large numbers when an infection occurs. When this reaction occurs, the reagent-milk mixture thickens or gels in proportion to the number of leucocytes present and indicates the severity of the inflammation. The greater the reaction, the higher the CMT score. The scoring of the CMT will vary somewhat, depending upon the skill of the person reading the result and the method used to conduct the test. Uniformity in technique is necessary if results are to be comparable.

The scoring of the CMT reactions shown in *Table I* indicate approximate somatic cell counts. As you can see, the count for each consecutive higher score is approximately three times that of the previous count.

Table I. CMT reaction scores.

CMT Score	Average Somatic Count (cells per milliliter)
N (negative)	100,000
T (trace)	300,000
1	900,000
2	2,700,000
3	8,100,000

Advantages of the CMT

- The CMT is fairly accurate in measuring somatic cell concentration in milk, correlating well with other tests.
- It is sensitive. Primarily developed for sampling quarters, it can also be used on "bucket" and "bulk tank" milk samples.
- Foreign material, such as hair or other matter, does not interfere with the test.
- It is inexpensive.
- The test is simple, and little equipment is needed.
- Easy clean-up after each test--simply rinse with water.
- Environmental temperature changes have little effect on the CMT as long as the milk has been refrigerated and is not over two days old.
- Herd mastitis levels can be estimated from tank CMTs. A CMT of 2 or 3 on tank milk indicates a probable high percent of infected cows.

Disadvantages of the CMT

- Scoring the test may vary between individual testers. It is necessary to be as consistent as possible to insure uniform results.
- Scores represent a range of leucocyte content rather than an exact count.
- False positive reactions occur frequently on cows that have been fresh less than ten days, or on cows that are nearly dry. These animals should be tested closer to the middle of the lactation.
- Occasionally, acute clinical mastitis milk will not score positive due to the destruction of leucocytes by toxins (poisons) from the infecting organism.

Conducting the CMT

Testing individual quarter samples requires the use of a plastic paddle having four shallow cups marked A, B, C and D for easy identification of the individual quarter from which the milk was obtained.

Approximately 1/2 teaspoon (2 cc) of milk is tested--the amount usually left in the cups when the paddle is held nearly vertical, or in an upright position. An equal amount of the CMT reagent is added to the milk. The paddle is then rotated in a circular motion to thoroughly mix the contents. Score in approximately ten seconds while still rotating. It is important to "read" the test quickly as the reaction tends to disintegrate after about 20 seconds. Rinse the paddle thoroughly with water and it is ready for the next test.

The proper interpretation of the 10 second reading is described in *Table II*. To become proficient and consistent, practice this test on milk of known cell count.

Treatment of CMT Positive Cows

During lactation, it is not generally recommended to treat all subclinical mastitis that is detected by the CMT alone. If you suspect that a subclinical case of mastitis may progress to clinical, rather than receding, prompt therapy should begin. Clinical cases (obvious mastitis) require early therapy for a long enough period of time to completely knock out the immediate infection. Laboratory culturing of milk from these quarters is necessary to provide the required information to prescribe proper therapy.

Table II. Interpretation and Scoring of the CMT test.*

Symbol	Suggested meaning	Description of visible reaction
N	Negative	Mixture remains liquid, homogeneous, with no evidence of thickening.
T	Trace	The slight thickening that forms is seen best by tipping the paddle back and forth and observing the mixture as it flows over the bottom of the cup. Trace reactions tend to disappear with continued rotation of the paddle. *Read at 10 seconds*.
1	Weak Positive	A distinct thickening of the liquid forms, but there is no tendency toward a gel formation. With some milk, the thickening may disappear after prolonged rotation of the paddle (20 seconds or more). *Read at 10 seconds.*
2	Distinct Positive	Mixture thickens immediately, and a gel formation is suggested. As the mixture is swirled, it tends to move in toward the center, exposing the bottom of the outer edge of the cup. When the motion is stopped, the mixture levels out and covers the bottom of the cup. *Read at 10 seconds.*
3	Strong Positive	A gel is formed, which causes the surface of the mixture to become elevated like a partially fried egg. There is usually a central peak that remains projecting above the main mass, even after the rotation of the paddle is stopped

*Portions of this chart are from "Screening Tests for the Detection of Abnormal Milk," published by the Department of Veterinary Medicine, Ohio State University.

The CMT provides information on the individual cow and can provide insight into the total herd status. By periodically recording your CMT results, you can monitor herd levels and investigate the possible

causes early when results show elevated CMT scores from one test to the next.

Regardless of CMT results, it is recommended that you maintain a carefully planned mastitis control program consisting of:

1. Proper machine function and milking procedure.
2. Hygiene and use of effective teat dips.
3. Culture and treatment of clinical cases as recommended by your veterinarian.
4. Dry cow treatment--all cows, all quarters--under the direction of your veterinarian.
5. Culling of problem cows. Cull cows with repeated clinical flare-ups and with a CMT score of 2 or more, in two or more quarters.

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